

WHAT IS CLAIMED AS NEW AND DESIRED TO BE PROTECTED BY
LETTERS PATENT OF THE UNITED STATES OF AMERICA, IS:

1. A mail article transportation and stabilization system,
for use in conjunction with a camera-based scanning system
whereby clear, accurate, and complete scanning, imaging, and
reading of address information, contained upon a plurality
5 of mail articles, can be achieved, comprising:
a housing comprising a front surface;
a camera fixedly disposed within said housing and
comprising a camera view port defined within said front sur-
face of said housing and across which a plurality of mail
10 articles are to be serially conveyed;
a conveyor belt for serially conveying the plural-
ity of mail articles across said camera view port of said
camera in a longitudinal direction such that information
contained upon the plurality of mail articles can be scan-
15 ned, imaged, and read by said camera; and
air plenum means defined within said housing for
generating air streams defining an air bearing layer upon
which said conveyor belt, and the plurality of mail articles
being conveyed by said conveyor belt, can be conveyed in a
20 substantially smooth, frictionless, and jitter-free manner
such that said camera can scan, image, and read the informa-
tion contained upon the plurality of mail articles in an ac-
curate, clear, and complete manner.

25

2. The system as set forth in Claim 1, wherein:

said camera comprises an optical character recognition (OCR) type camera.

5

3. The system as set forth in Claim 1, wherein:

said camera comprises a bar code reader (BCR) type camera.

10

4. The system as set forth in Claim 1, further comprising:

a pair of conveyor belt rollers around which said conveyor belt is routed such that said conveyor belt comprises an outer run section, disposed remote from said front surface of said housing and said camera view port, and an inner run section disposed adjacent to said front surface of said housing and said camera view port.

20

5. The system as set forth in Claim 4, wherein:

said housing has a predetermined longitudinal extent; and

said pair of conveyor belt rollers are disposed at longitudinal extremes of said housing such that no conveyor belt components, other than said inner run section of said conveyor belt, are disposed in contact with said front surface of said housing and said camera view port whereby said inner run section of said conveyor belt can be conveyed across said front surface of said housing upon said air

bearing layer in a substantially frictionless manner.

5 6. The system as set forth in Claim 1, wherein:

said inner run section of said conveyor belt has a substantially planar configuration defining a conveyance plane for the plurality of mail articles; and

10 said front surface of said housing has a substantially curvilinear configuration such that a first upstream end portion of said front surface of said housing diverges away from said conveyance plane of said inner run section of said conveyor belt and thereby defines therewith an entrance slot within which air discharged from said air plenum means
15 defined within said housing causes the plurality of mail articles to be aerodynamically lifted into engagement with said inner run section of said conveyor belt, while a second downstream end portion of said front surface of said housing likewise diverges away from said conveyance plane of said
20 inner run section of said conveyor belt and thereby defines therewith an exit slot within which air discharged from said air plenum means defined within said housing causes the plurality of mail articles to experience aerodynamic lift so as to thereby be maintained in engagement with said inner run
25 section of said conveyor belt.

7. The system as set forth in Claim 1, wherein:

30 said housing has a predetermined vertical extent;
and

10050784-011802
20250718 13:20:50T

5 said air plenum means comprises at least one aper-
tured strip from which said air streams are generated, said
at least one apertured strip having a predetermined vertical
extent which is less than said predetermined vertical extent
of said housing.

8. The system as set forth in Claim 7, wherein:
10 said air streams generated from said at least one
apertured strip of said air plenum means are characterized
by means of an air pressure value which is substantially
less than atmospheric pressure; and
 said at least one apertured strip, having said
15 predetermined vertical extent which is less than said pre-
determined vertical extent of said housing, is located at a
substantially central vertical location within said housing
such that ambient atmospheric pressure zones are disposed
above and below said sub-atmospheric air streams generated
20 from said air plenum means so as to confine said sub-atmos-
pheric air streams to predetermined locations for acting
upon the plurality of mail articles.

25

9. The system as set forth in Claim 4, wherein:
 at least one of said conveyor belt rollers com-
prises a drive roller; and
 a servo drive motor is operatively connected to
30 said at least one conveyor belt drive roller.

10. A mail article transportation and stabilization system, for use in conjunction with a camera-based scanning system whereby clear, accurate, and complete scanning, imaging, and reading of address information, contained upon a plurality of mail articles, can be achieved, comprising:

a housing comprising a front surface;

a camera fixedly disposed within said housing and comprising a camera view port defined within said front surface of said housing and across which a plurality of mail articles are to be serially conveyed in a longitudinal direction such that information contained upon the plurality of mail articles can be scanned, imaged, and read by said camera; and

air plenum means defined within said housing for generating an air bearing layer upon which the plurality of mail articles being conveyed can be conveyed in a substantially smooth, frictionless, and jitter-free manner such that said camera can scan, image, and read the information contained upon the plurality of mail articles in a clear, accurate, and complete manner.

11. The system as set forth in Claim 10, wherein:

said camera comprises an optical character recognition (OCR) type camera.

12. The system as set forth in Claim 10, wherein:

said camera comprises a bar code reader (BCR) type

camera.

5 13. The system as set forth in Claim 1, further comprising:

10 a conveyor belt, for conveying the plurality of mail articles across said camera view port, comprising an outer run section, disposed remote from said front surface of said housing and said camera view port, and an inner run section disposed adjacent to said front surface of said housing and said camera view port.

15 14. The system as set forth in Claim 13, wherein:

only said inner run section of said conveyor belt, is disposed in contact with said front surface of said housing and said camera view port whereby said inner run section of said conveyor belt can be conveyed across said front surface of said housing upon said air bearing layer in a substantially frictionless manner.

25 15. The system as set forth in Claim 10, wherein:

said inner run section of said conveyor belt has a substantially planar configuration defining a conveyance plane for the plurality of mail articles; and

30 said front surface of said housing has a substantially curvilinear configuration such that a first upstream end portion of said front surface of said housing diverges

away from said conveyance plane of said inner run section of
said conveyor belt and thereby defines therewith an entrance
slot within which air discharged from said air plenum means
defined within said housing causes the plurality of mail
5 articles to be aerodynamically lifted into engagement with
said inner run section of said conveyor belt, while a second
downstream end portion of said front surface of said housing
likewise diverges away from said conveyance plane of said
inner run section of said conveyor belt and thereby defines
10 therewith an exit slot within which air discharged from said
air plenum means defined within said housing causes the plu-
rality of mail articles to experience aerodynamic lift so as
to thereby be maintained in engagement with said inner run
section of said conveyor belt.

15

16. The system as set forth in Claim 10, wherein:

said housing has a predetermined vertical extent;

20 and

said air plenum means comprises at least one aper-
tured strip from which said air streams are generated, said
at least one apertured strip having a predetermined vertical
extent which is less than said predetermined vertical extent
25 of said housing.

17. The system as set forth in Claim 16, wherein:

30 said air streams generated from said at least one
apertured strip of said air plenum means are characterized

by means of an air pressure value which is substantially less than atmospheric pressure; and

5 said at least one apertured strip, having said predetermined vertical extent which is less than said predetermined vertical extent of said housing, is located at a substantially central vertical location within said housing such that ambient atmospheric pressure zones are disposed above and below said sub-atmospheric air streams generated from said air plenum means so as to confine said sub-atmospheric air streams to predetermined locations for acting upon the plurality of mail articles.

15 18. The system as set forth in Claim 13, wherein:

said conveyor belt is routed around a pair of rollers at least one of which comprises a drive roller; and a servo drive motor is operatively connected to said at least one conveyor belt drive roller.

20

19. A method for transporting mail articles, in order to obtain clear, accurate, and complete scanning, imaging, and reading of address information contained upon a plurality of mail articles, comprising the steps of:

25 fixedly disposing a camera within a housing such that a camera view port is defined within a front surface of said housing;

30 serially conveying a plurality of mail articles along a flow path which extends across said camera view port

of said camera such that information contained upon the plurality of mail articles can be scanned, imaged, and read by said camera; and

generating air streams from said housing for defining an air bearing layer upon which the plurality of mail articles can be conveyed in a substantially smooth, frictionless, and jitter-free manner such that said camera can scan, image, and read the information contained upon the plurality of mail articles in a clear, accurate, and complete manner.

20. The method as set forth in Claim 19, comprising the additional step of:

providing said front surface of said housing with a substantially curvilinear configuration such that a first upstream end portion of said front surface of said housing diverges away from said article flow path and thereby defines therewith an entrance slot within which said generated air discharged from said housing causes the plurality of mail articles to be conveyed in an aerodynamically lifted manner along said article flow path so as to establish said substantially smooth, frictionless, and jitter-free conveyance of the plurality of mail articles along said article flow path, while a second downstream end portion of said front surface of said housing likewise diverges away from said article flow path and thereby defines therewith an exit slot within which said generated air discharged from said housing causes the plurality of mail articles to be conveyed in an aerodynamically lifted manner along said article flow

path so as to maintain said substantially smooth, frictionless, and jitter-free conveyance of the plurality of mail articles along said article flow path.

5

10

15

20

25

30

10050784 011802